produced by using the semiconductor device 206.

In addition, as a first interlayer insulation film 202, there may be used a polymethyl siloxane film formed in a manner similar to that of the second interlayer insulation film 204. The laminate film of these polymethyl siloxane films has a practically sufficient strength. In addition, the laminate film of the above polymethyl siloxane films has a substantially uniform, good quality which does not prevent the performance of the semiconductor device 206. This applies to a case of using a polymethyl siloxane film made of three or more layers.

In addition, a modified layer 204b may be formed at a position such that a deviation of its processing dimensions can be adjusted according to the depth of a desired wiring groove.

Although embodiments of the present invention each have been described above, the present invention is not limited to these embodiments. For example, although the above embodiments each has shown a polymethyl siloxane film as an example of an insulation film, the present invention is applicable to film forming of other insulation films. For example, there can be exemplified a coated organic silicon oxide film (SOG) having Si-C bonding (in general, $Si-CH_3$ bonding) in its film, for example, an organic film, or a insulation film obtained by curing the coated solution by a heat

or the like. From another point of view, there can be used an insulation film essentially consisting of a material of which film forming reaction is accelerated by using the heating work and the electron beam irradiation work in combination, the material being free of degrading a quality.

In addition, although a spin coating technique has been used as a vanish coating technique in the above embodiments each, another coating technique such as nozzle scan coating technique may be used. In forming an insulation film by using such coating technique, instead of increasing a temperature of the vanish in a stepwise manner, thereby evaporating a solvent, the vanish is disposed under a reduced pressure atmosphere, and the solvent is evaporated, whereby the above insulation film may be fixedly bonded with a substrate.

Further, although the above embodiments each has shown an interlayer insulation film with its low dielectric rate as an example of an insulation film, the present invention is applicable to another insulation film such as a gate insulation film.

Furthermore, the sequence of a process for forming a coat film is not limited to that shown in the above embodiments each. The sequence of carrying out the steps of heat treatment plus the electron beam irradiation treatment process; the count of carrying out heat treatment and the electron beam irradiation

treatment; and heat treatment and the electron beam irradiation treatment conditions can be changed as required according to type or use of the coat film. The electron beam irradiation conditions include, for example, the electron beam energy, irradiation dose, atmosphere, and substrate temperature during irradiation.

Otherwise, a variety of settings such as the vanish heating temperature and heating time, a pressure reducing value of the atmosphere can be changed as required, similarly. That is, the value of settings may be provided in a variety of combinations according to manufacturing environment as long as the performance of the semiconductor device can be achieved at a desired level.

In addition, a material used for wiring may be an element other than Cu. The wiring resistance may be sufficiently low to an extent such that the operating speed of the semiconductor device is not reduced.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.